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ON THE GEOLOGY OF THE LINE OF THE CANADIAN PACIFIC RAILWAY.

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Observations *on the* Geology *of the* Line *of the* Canadian Pacific Railway. By J. W. Dawson, LL.D., F.R.S., F.G.S., &c.

Having had an opportunity last summer of passing over the line of this railway, and of examining some of the sections exposed on the road and in its vicinity, it may be useful to note the facts observed.

All of the country on both sides of the line has been more or less explored by the officers of the Geological Survey, more especially by Dr. Selwyn, Dr. G. M. Dawson, and Dr. R. Bell; and without repeating what they have published, I shall confine my remarks chiefly to facts discovered or brought into greater prominence in the construction of the road.

Between Ottawa and Port Arthur the road was only partially opened last summer, though it had penetrated into the region of typical Huronian rocks north of Georgian Bay. Next summer it will be opened throughout, or at least to Algoma Mills, whence steamers will run on Lake Superior to Port Arthur. This section of the road will be of great geological interest, as it abounds in cuttings through Laurentian and Huronian rocks, and will also expose the Keweenian or Upper Copper-bearing series and other formations which, though newer than the Huronian, are believed to be Pre-Cambrian. Last summer, travellers were conveyed by steamer from Collingwood to Port Arthur, through Lakes Huron and Superior, and it was at Port Arthur that their geological experiences began.

Port Arthur is at the head of Thunder Bay, and opposite it are the grand trappean masses of Thunder Cape and of the islands in front of it—masses which are associated with the Keweenian series.

Near the town of Port Arthur the rocks exposed are dark-coloured quartzites and quartzose slates, having occasional veins of white quartz and of amethyst. These beds are believed to underlie the Keweenian series, but to be newer than the true Huronian *. Their surfaces show a few peculiar markings, which may be of organic origin, but are not determinable.

From Port Arthur to Rat Portage the country is at first low, with many swamps and ponds; but occasional rock-cuttings show different varieties of Laurentian gneiss and bands of greenish schistose beds, probably Huronian. In the latter occur the veins now being worked for gold in this vicinity. I did not visit any of the mines; but I saw specimens, more especially from the "Huronian Mine," about 70 miles from Port Arthur. They consisted of white quartz holding visible gold and sylvanite in a rock which appeared to be chloritic slate. Several of these veins are now being worked on the shore of the Lake of the Woods, and are very accessible from Rat Portage. In approaching the place last named, fine sections

* Animiké series of Hunt.

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are seen of grey Laurentian gneiss with red felspathic veins, and at Rat Portage itself is a faulted junction of the Huronian and Laurentian, described by Dr. G. M. Dawson, in his Report on the 49th Parallel, and to which the Falls of the Winnipeg river at that place are due.

It has been remarked by previous observers that the Huronian of this district is somewhat different in mineral character from that of the typical district of Georgian Bay, and that it presents a more highly crystalline aspect and an appearance of conformability with the Laurentian. These characters, which are very manifest in some of the railway-cuttings, suggest the possibility that it may be a lower member of the Huronian, partly filling the gap indicated by the great unconformability of the Laurentian and Huronian on Lake Huron itself. Neither of these series has yet been brought into any direct stratigraphical connexion with the Norian or Upper Laurentian formation of Eastern Canada.

It may be well to remark here, in connexion with this western extension of the old crystalline rocks of Canada, on the uniformity of mineral character which they present over 40 degrees of longitude, from Labrador to the Winnipeg river, and after a space of 27 degrees further, in the mountains of British Columbia. Their similarity to the older Eozoic rocks of Brazil, Scotland, Scandinavia, and Southern and Eastern Europe, is equally well marked; and I have the pleasure of placing this evening on the table a collection of similar rocks from the neighbourhood of the first cataract of the Nile, so similar to the Laurentian of Canada that any geologist familiar with these rocks, and placed before the sections of gneiss and micaceous and hornblende schist, traversed by veins of granite and syenite, which are exposed in the vicinity of Assouan, might be excused for imagining that he was examining one of the cuttings on the Canadian Pacific. At Assouan there is also an overlying unconformable series, consisting apparently largely of igneous products, and which may represent the Huronian of Canada. These rocks, with my notes of the sections of the Egyptian Laurentian, I propose to leave in the hands of Prof. Bonney, who has kindly consented to report on them to the Society at a future time *.

Beyond Telford Station the old rocks disappear and are succeeded by muskeg or swamp country, which here forms the border of the Great Red River plain. This vast swamp, 20 miles in width, and extending north and south for a great distance, with a depth of peaty matter stated at nine feet, affords a modern illustration of the formation of the beds of brown coal which occur in the Laramie and Cretaceous further west; and in the somewhat monotonous character

* In the Collection of the society there is a suite of specimens from Assouan, presented by Mr. Hawkshaw, in which there are specimens from both of the crystalline formations above mentioned; but he does not seem to have distinguished between these in his published paper, which is so valuable as a description of this interesting locality. See Quart. Journ. Geol. Soc. vol. xxiii. 1867.

of its vegetation and the absence of large trees, illustrates also the paucity of vegetable fossils by which these beds are sometimes characterized.

In the region above referred to, glacial striæ are often observed upon the hard rocks uncovered in railway excavations; and there are glacial deposits of two kinds, though they are not very continuous or of great depth, the indications being that the region was, in the Pleistocene period, an area rather of denudation than of deposition. One marked variety found between the ridges of crystalline rock is a stratified red clay sometimes with greenish bands. This kind of deposit, which abounds in the drift area of Southern Manitoba and Minnesota, has been attributed to the waste and driftage westward of the red clays and sandstones of the Keweenian formation of Lake Superior. It is not usually a Boulder-clay, but where it approaches rocky ridges, is seen to overlie or pass into clay with numerous local boulders. Boulders are often to be seen heaped in great numbers against the sides of steep rocky ridges. Not far from Rat Portage, a conspicuous instance is afforded by a steep escarpment of hornblendic rock, which is seen to be furrowed in a deep and fantastic manner by ice-action, while its base is piled with large masses of Laurentian rock. In many places also gravel beds and ridges containing boulders appear, as a more recent deposit than the red clay, in the same manner as we find in Eastern Canada and also westward on the plains.

An interesting feature of these clays in their extension into Minnesota is the presence in them of Foraminifera of several species to which attention has been directed by Mr. B. W. Thomas, of Chicago, who has kindly sent me mounted specimens of these organisms. They belong to the genera *Textularia*, *Rotalia*, and *Globigerina*; but are not properly fossils of the Boulder-clay itself, being in all likelihood derived from the Cretaceous marls of the west, which abound in such organisms. Indirectly, however, they constitute an evidence of the aqueous origin of the clays, as they imply much disintegration of the marls and the driftage of their materials to great distances.

At Stony Mountain and Selkirk, on the borders of the Red River plain, are cream-coloured Silurian limestones now extensively quarried, and affording a beautiful building-stone. They are rich in marine fossils, of which considerable collections have been made by a local geologist, Mr. J. H. Panton. From these it would appear that within a very moderate thickness of beds there occur fossils ranging from the Trenton to the Niagara age, thus presenting an instance of a long lapse of time marked by a very small amount of deposit, similar to that which occurs in some other western localities. The precise stratigraphical subdivisions of these fossils, if such exist, remain to be worked out. I may here remark that while the outcrops of these limestones are at present of comparatively small extent, the immense number of boulders scattered westward on the plains to the base of the Rocky Mountains, more than 800 miles distant, shows that they must, before the glacial period, have occu-

pied a large area and probably overlapped large portions of the Huronian and Laurentian series.

In approaching the Red River at Winnipeg, we pass over the eastern half of the great lacustrine deposit of the Red-River valley, extending, with a width of about 40 miles along that river, from the north to the south of the province of Manitoba, and constituting with its extension southward into the United States, what some of the geologists of that country have somewhat fancifully named the basin of the extinct "Lake Agassiz." It presents a flat surface of the most typical prairie land, and consists of the finest possible silt with a covering of black vegetable soil. Very few boulders or stones appear on its surface, or in the cuttings made in it for drainage; and the former are of small size, and may be accounted for by lacustrine ice-drift under climatal conditions similar to those now existing.

West of the Red-River valley we enter on the higher prairie lands, extending westward about 700 miles to the foot of the Rocky Mountains. From the Red-River prairie, which is about 800 feet above the level of the sea, they rise by two principal steps or escarpments, and intervening gradual slopes, to the higher plains at the base of the mountains, which in some places are 4200 feet above the level of the sea. The physical features of this region have been fully described by Dr. G. M. Dawson, in his paper on the "Superficial Geology of the Central Region of North America," in the Journal of this Society for November 1875, where also will be found reference to the work of earlier explorers in this field. I may add that the facts stated in that paper afford, in my judgment, the best existing key to the solution of the difficult questions of glacial geology in North America; and that, when applied to the regions south and east of the districts described, they are sufficient to enable any geologist to perceive the fallacy of the theories of continental land-ice applied by extreme glacialists to explain the drift phenomena of the middle and western parts of the United States.

With the exception of a small area of Miocene Tertiary recently discovered*, the whole of this region is underlain by Cretaceous clays, sandstones and limestones, and by the shales and sandstones of Laramie or Lignitic Tertiary group, by some geologists regarded as late Cretaceous, by others as early Eocene (see Section, fig. 2, p. 382); but which the writer and other Canadian geologists have been disposed to regard as in great part a transition series, connecting the newer Cretaceous with the Eocene. Out of these formations the two prairie escarpments have been cut by water, the higher in a period of partial submergence before the glacial period, the lower at a later date by the waters of the extinct lake of the Red-River valley.

The latest results as to the stratigraphical arrangement and relations of these deposits are stated in the following table, abridged, and slightly modified from the Reports of Dr. G. M. Dawson in the

* At the Cypress Hills, Mr. R. G. McConnell, of the Canadian Survey, is stated to have found beds holding remains of *Brontotherium*, the first discovery of this kind hitherto recorded within the limits of Canada.

publications of the Geological Survey of Canada. In these, detailed descriptions of the structure and distribution of the different members of the series will be found. It is to be observed, however, that in consequence of the flatness and slight undulation of the beds, and the rarity of good exposures, as well as the probable recurrence of similar beds with somewhat similar fossils at different horizons, some doubts exist as to the detailed arrangement.

Formations in the Prairie country traversed by the Canadian Pacific. (Order descending.)	*European Equivalents.*
Laramie or *Lignitic Series*: sandstones, shales and clay, lignite, fossil plants, brackish and fresh-water shells—1500 feet or more.	Paleocene or Latest Cretaceous.
Fox-Hill Group: yellowish sandstones and shales with marine shells—1500 feet or more.	Maestricht Beds (*Danien*).
Ft. Pierre Group: dark-coloured and grey shales with some sandstone, marine fossils and lignite—250 to 300 feet.	White Chalk (*Sénonien*).
Niobrara Group: limestone and marls with marine shells, and locally shales and sandstones with lignite and fossil plants—100 to 200 feet.	Chalk Marl.
Ft. Benton Group: light-coloured shales with shells and bones of Dinosaurs and lignite—200 to 400 feet.	Upper Greensand (*Cénomanien*).
Dakota Group: brown and grey shales and sandstones, with lignite and lignitic coal—200 to 300 feet. The Neocomian series does not seem to be represented east of the Rocky Mountains, but is found in British Columbia.	Gault.

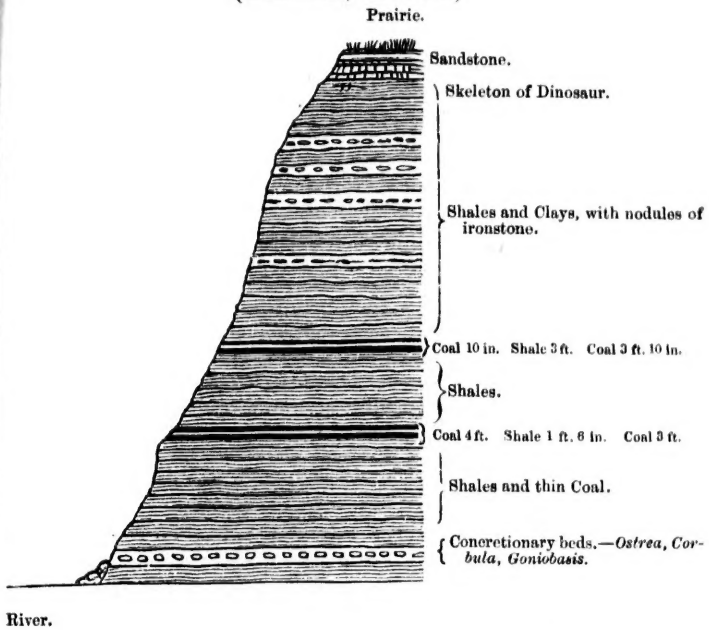
I may illustrate this section and also some of the difficulties incident to correlation of beds in this region, by reference to some exposures which I visited last summer.

One of these is in the vicinity of the town of Medicine Hat, where the railway crosses the South Saskatchewan river. Here the river runs through a deep cutting in the Cretaceous rocks, which in some places present high and broken cliffs seamed with coulées, and in others fall into grassy slopes or are encumbered with masses of burned shale of a bright red colour, produced by the spontaneous combustion of the lignites in the banks.

About ten miles above Medicine Hat, on the right bank of the river, at a point where one of the coal-beds was being opened, the cliff is about 300 feet in height, and consists of shale or indurated clay, of grey, dark, and purplish colours, with several beds of lignitic coal in the central portion; and near the top are irregular layers of grey and ferruginous sandstone, some beds of which hold pebbles and nodules of iron-ore.

At the base of the section (fig. 1), near the level of the river, the shales hold calcareous concretionary bands, with bivalve shells characteristic here of the Cretaceous beds *, which are the only marine fossils seen in the section. About 90 feet from the base of the section is a bed of coal 3 feet thick, and covered with a shale roof or parting of 2 feet 6 inches, above which is another coal, 4 feet thick, with a shale roof. For about 50 feet above this the cliff is occupied with shales, holding several thin coals; and on this rests another bed of coal 3 feet 10 inches thick with roof of shale 3 feet thick, and over this a small coal 10 inches thick. Above this shales again occur, and near the top a bed of ferruginous and pebbly sandstone very unequal in hardness and texture. In this Mr. Molyneux, an engineer in charge of the works, had found some large bones, and on further excavation we obtained considerable portions of the skeleton of a large Dinosaur believed to belong to the genus *Diclonius* of Cope, scattered teeth of which occur in the same bed.

Fig. 1.—*Section on South Saskatchewan river, near Medicine Hat.*
(Thickness, 220 feet.)



The less pure coals in this section are brown coals, composed of leaves and vegetable débris compacted together. The better coals, including the thicker beds above referred to, are apparently composed

* *Ostrea glabra, Anomia micronema, Corbula subtrigonalis, C. perundata*, are characteristic, according to Dr. G. M. Dawson. There is also a species of *Goniobasis*.

principally of coniferous wood, havi
the texture of a bright hard lign
approaching to the characters of t
bituminous coal, and affording a val
able fuel. Beds of this character a
very extensively distributed over t
region*. The shales associated wi
the coals hold many vegetable frag
ments; but no well-characterized sp
cimens were obtained, though the
were abundant indications of forest
of angiospermous and gymnospermou
trees. Better-preserved remains
them, obtained from other section
will be found referred to in a paper b
the writer in the 'Transactions of th
Royal Society of Canada' (vol. i
1883).

These beds at Medicine Hat ar
believed, on stratigraphical evidence
by the officers of the Geological Survey
to be below the Ft. Pierre group, and
therefore probably of Cenomanian
age; yet in lithological character they
have a very close resemblance to the
Laramie beds; and even their fossils,
so far as known, are scarcely distin-
guishable from those of the upper
series, both holding shells of the same
genera. They would seem to occupy
the top of a flat anticlinal, on both
sides of which are seen beds a little
higher in the series.

About twenty miles east of Medicine
Hat, at Ross's Creek, some of the next
beds in ascending order occur, and are
believed to belong to the Pierre series.
They are light-coloured marls and clays
with *Ammonites*, *Cytherea*, and bones
of fish and Dinosaurs; above these
are gypseous clays; and, still higher,
brownish shales holding a bed of
lignite.

West of the localities above de-
scribed, similar Cretaceous beds occupy
the country nearly to the base of the
mountains (fig. 2); and beds of coal, some

* See map by Dr. G. M. Dawson, and Re-
port on Bow and Belly Coal Fields. Geolo-
gical Survey of Canada, 1883.

Fig. 2.—*General Section from the Rocky Mountains to Cypress Hills.*

The dark bands indicate the horizons of Coal and Lignite.

of them supposed to overlie those seen at Medicine Hat, occur at Maple Island, Blackfoot Crossing, and elsewhere.

Near Calgary, however, on the Bow river, a formation occurs which differs from those previously seen, and probably belongs to the upper part of the Laramie group. Its most conspicuous feature is a bed of whitish sandstone, about 20 feet in thickness, and presenting all the appearance of a coal-formation sandstone. Some of its layers abound in well-preserved leaves of Dicotyledonous trees of numerous species and, so far as appears from a cursory examination, similar to those described by the writer from the sandstones of the Lignitic group near the Souris river *. In state of preservation and in some of their generic forms, these leaves much resemble those of the Swiss Molasse; and no doubt the Calgary sandstone is an Eocene Molasse, related in mode of deposition to the Rocky Mountains as the Molasse is to the old rocks of the Alps. This sandstone is underlain and overlain by beds of grey, ferruginous, and black shales, in which are calcareous bands holding fossil shells of the genera *Goniobasis* and *Corbula*.

West of Calgary, as the Cretaceous and Laramie beds enter the Rocky Mountains and approach the junction with the Palæozoic rocks, they become much folded and disturbed, and the coals contained in them become harder and drier in quality, in some places approaching to anthracites.

The development of the Cretaceous series in the region under consideration is, in the main, similar to that described by the United States geologists as occurring in the country south of the 49th parallel; and it shows the wide extent of plain and table land between the Laurentian and Palæozoic region on the east and the Rocky Mountains on the west to have alternated in that period between conditions of shallow water and of vast bogs and swamps. Such conditions were, however, more prevalent towards the south, where this ancient Cretaceous Mediterranean communicated with the ocean; and toward the north, in the vicinity of the Peace river, there seems to have been a barrier of land or shoals. With the exception of the folds impressed on their western edge by the elevation of the Rocky Mountains, these beds have remained entirely unchanged and undisturbed, and there seems to have been a continuity of deposition and an absence of unconformability from the Cretaceous into the Eocene and Miocene periods, though sandstones and conglomerates at several horizons indicate some considerable intensity of water-driftage. It would seem that over large parts of the area slight elevations and subsidences led to alternations of driftage of clay from the Arctic regions, or the accumulation of organic limestone and marl in warm waters sheltered from the north, with sand-drift in shallow water, or actual land and swamp surfaces holding lakes and lagoons.

With reference to the contrast between these undisturbed Cretaceous beds and those of some other countries, we need not go

* Reports Canadian Survey, Memoir on Cretaceous and Tertiary Plants, Trans. R. S. of Canada, 1883.

beyond America, since in the coast ranges of British Columbia th beds of this age are quite as violently disturbed and as much altere as in the mountain-districts of Europe and Asia. Throughou North America, however, there seems a far less development o great calcareous deposits than in the Cretaceous of the Old World though in the Niobrara group we have Foraminiferal marls essentiall of the nature of chalk, and toward the south abundance of marin organisms generically similar to those of the Chalk of Europe. In America, as in Europe, remains of Teleostean fishes become plentiful in the Cretaceous, and the Dinosaurian reptiles continue to the end without any indication of the placental Mammalia. In America as in Europe, angiospermous exogens of genera still existing appear in the middle Cretaceous, and Lesquereux has described in the United States, and the writer in Canada, a rich and abundant exogenous flora very similar to that still extant in America, from the Dakota, Benton, and Niobrara formations.

The distribution of the drift over these plains has been fully described in the paper above referred to. I shall therefore notice here only such new facts and inferences as presented themselves in connexion with the line of the railway.

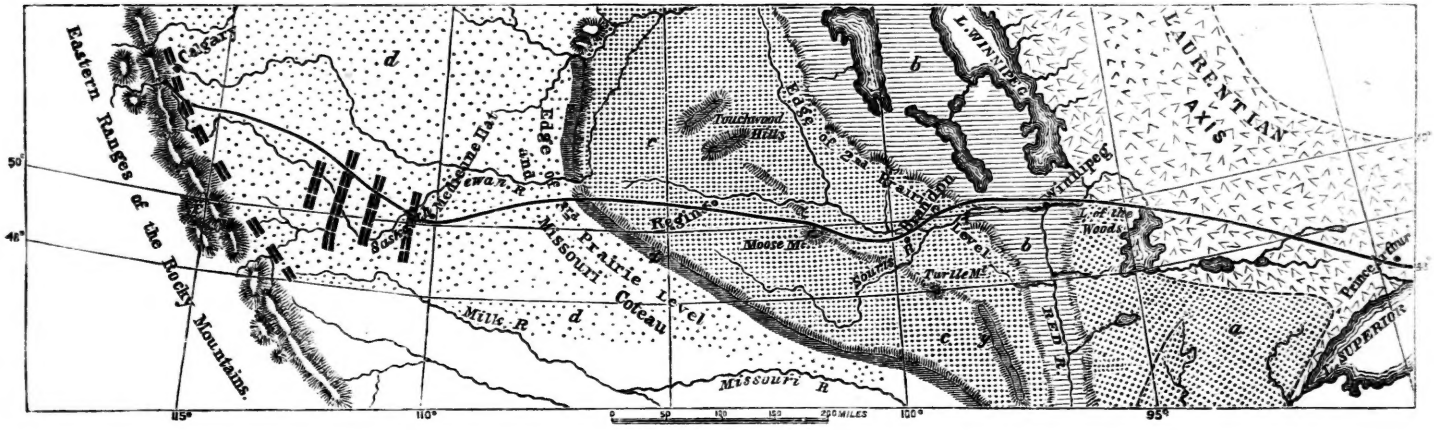
At the west side of the Red-River plain, where the railway ascends to the second plateau (see Map, fig. 3), are seen sandhills or dunes, obviously an old lake-margin, and, so far as seen, without large boulders or other evidences of heavy ice.

The second prairie plateau everywhere presents travelled boulders associated either with Boulder-clay or overlying sands and gravels. The percentage of Laurentian, Huronian, and Silurian rocks, and of stones from the Rocky Mountains among those visible on the surface, has been noted by Dr. G. M. Dawson, who has also mentioned the line of elevations made up of drift, perhaps based on outliers of Cretaceous beds, which extends from Turtle Mountain northward to the Touchwood hills along the middle of this plain. In the line of these eminences, where the railway crosses on the plain, there is evidence of a connecting belt of sand and gravel with boulders, and within this are Oak Lake and other lakes and ponds. Thus there is really a continuous margin of the glacial sea on this line, and the higher and more marked hills are merely its more elevated portions*.

The Great Missouri coteau to which Dr. G. M. Dawson first directed prominent attention as a glacial feature, and which fringes the margin of the third plateau, about 400 miles west of Winnipeg, is now known to be continuous with similar ridges extending southward into the United States and eastward towards the Atlantic, and which have been described as the terminal moraine of a great continental glacier. In the western plains, however, where it has its greatest development, it cannot be explained in

* The cuttings of the railway do not appear likely to modify the statements respecting the percentages of boulders; but they seem to show that, as in many other parts of America, boulders are more abundant near the surface than below.

Fig. 3.—*Sketch Map of the Country traversed by the Canadian Pacific Railway, between the Rocky Mountains and Prince Arthur.*
(Slightly altered from a Map by Dr. G. M. Dawson, in Q. J. G. S. vol. xxxi. pl. xxxii.)



a. Boulder-drift area of Lake Superior. *b.* Red-river Prairie. *c.* Second Prairie level. *d.* Third Prairie level. *y.* First range of Coteau drift. *z.* Grand Coteau. ‖ Approximate outcrop of Cretaceous Coals.

this way, but must mark the margin of an ancient glacial sea, at least of that deeper portion of such sea in which heavy ice could float, while in its upper portion it shows evidence of having been, in the later periods of its formation, an actual water-margin.

The railway, taking advantage of the oblique valley of Thunder Creek, crosses the coteau at one of its least-marked portions, but where it still presents very definite and striking characters. On entering it, the railway passes for nearly 30 miles through a rolling or broken country, consisting of successive ridges and mounds interspersed with swales and alkaline ponds without outlet. To this class belongs a somewhat extensive series of lakes known as the "Old Wives' Lakes." The highest point of the coteau on this section appears to be near Secretan Station.

As seen in the road-cuttings, the basis of the ridges appears to consist of thick beds of imperfectly stratified clay, derived from the disintegration of the local Cretaceous beds, but with many Laurentian boulders. In one place the clay was observed to be crumpled as if by lateral pressure. Above the clay are stratified gravels, also with large boulders, most abundant at top. The ridges are highest and most distinct at the eastern or lower side, and gradually diminish towards the upper or western margin, where they terminate on the broadly rolling surface of the upper prairie.

The history of the coteau would seem to have been as follows:—

1. The excavation in pre-glacial times of an edge or escarpment in the gently sloping surface of the Cretaceous and Laramie beds, and the cutting by subaerial causes of coulées and valleys of streams in this escarpment.

2. Submergence in the glacial period, in such a manner as to permit heavy ice loaded with Laurentian débris to ground on the edge of the escarpment and deposit its burden there, while at the period of greatest submergence deep water must have extended much further westward. These conditions must have continued for a long time and with somewhat variable depth of water.

3. Re-elevation, during which gravel ridges were formed, until at length the coteau became the coast-line of a shallow sea, which lingered at a later date along the line already referred to in advance of the coteau.

4. On the re-elevation of the country, the transverse ravines and valleys were so effectually dammed up by the glacial ridge, that the surface waters of the region, now comparatively arid, have to remain as alkaline lakes and ponds behind the coteau.

The upper prairie plateau, extending from the coteau to the Rocky Mountains, has, on its general surface, comparatively few boulders; yet these are locally numerous, especially on the eastern and northern sides of some gentle elevations of the prairie. They consist, as before, of Laurentian gneiss, Huronian schists, and yellow Silurian limestone, all derived from the eastern side of the plains, some of the boulders of Laurentian gneiss being of great dimensions. Some of these have been used in modern times by the

Discussion.

The President called attention to the numerous important subjects referred to in this paper, and expressed his conviction of the great gratification that was felt by the Fellows of the Society at having Principal Dawson among them in person.

Mr. Bauerman said he had no knowledge of the exact line of country described by Principal Dawson, but that he was pretty well acquainted with some neighbouring regions. The first point of importance to which he would advert was the occurrence of Upper Laurentian in the country west of Lake Superior. As that formation is represented on the Labrador by a form of gneissic rock almost entirely composed of labradorite, the discovery further west of a series stratigraphically equivalent, but lithologically different, was a matter of great interest. He next referred to the Laramie group, and remarked upon the great lignitic series which occurs similarly on other lines of railway crossing North America further to the south. All these rocks contain carbonaceous beds different from the usual Tertiary brown coals of Europe, some being bituminous, like those of certain parts of Austria. Near the head of the Colorado river, some 1000 miles south of the district described in the paper, there was good coking coal, and close by good anthracite also occurred in these same Cretaceous beds. He said that the Rocky Mountains, in this section, as seen by him, wanted the Laurentian axis which was met with further south. In conclusion he observed that the westerly carriage of glacial drifts, and the peculiar erosion of the surface of this flat country around the Great Lakes were very remarkable phenomena.

Mr. Topley inquired, with regard to the distribution of the anthracite, whether it was always found in connexion with disturbed beds.

Principal Dawson in reply thanked Mr. Bauerman for the additional illustrations which he had given from the country to the south of the Canadian boundary. In answer to Mr. Topley's question, he stated that in the undisturbed portions of the Cretaceous and Laramie, the coals are of various qualities, the difference depending partly on the material of which they are composed, whether wood of trees, or débris of foliage, &c., and partly on diversity of age; but the anthracitic coals are limited to the districts in which the beds are disturbed, and the same remark applies to the Cretaceous anthracite of the Queen Charlotte Islands on the west coast, as compared with the bituminous coal of Vancouver Island. He hoped that many Members of the Geological Society would be in Montreal in August, to take part in the British Association excursions over the western districts which he had described.